

**ACADEMIC YEAR 2023 - 2024**

Program	Semester	Term	Paper
<b>FOUNDATION</b>	<b>2</b>	<b>1</b>	<b>MAIN</b>
MODULE NAME:	<b>BASIC MATHEMATICS II</b>		
MODULE CODE:	<b>FMTH004</b>	EXAM DATE:	<b>29/04/2024</b>
INSTRUCTOR'S NAME:	<b>Muhammad Kazam</b>	DURATION:	<b>2 hrs.</b>

<b>Questions to be answered on:</b> <input checked="" type="checkbox"/> Space provided on the question paper	<b>Allowed tools:</b> Pen Pencil (only for drawing)	<b>Number of pages</b> (Incl. cover page): <b>10</b>
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**Points of attention:**

- For each question, the maximum earned points are mentioned between brackets at the end of each question.
- Write very clearly! Answers that are not readable are not marked and don't get points!
- Make sure your answers are written to the point.
- All answers must be written **in English**.
- Write all the answers **in blue or black pen only**.
- When finished, submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Cheating / copying is not allowed and will result in failing the exam.

**FINAL MARKS**

<b>STUDENT NAME:</b>		<b>40</b>
<b>STUDENT ID:</b>		
<b>CLASS:</b>		

Number of answer scripts:.....

Invigilator:.....

Student's signature: .....

Time of receipt:.....

## Question 1

[10 Marks]

Circle the correct option to fill in the blanks.

<b>Example.</b> 85 is a _____ digit number.			
<b>a</b> 1	<b>b</b> 2	<b>c</b> 3	<b>d</b> 4
<b>i.</b> An equation of degree 2 is called _____ equation.			
<b>a</b> linear	<b>b</b> quadratic	<b>c</b> cubic	<b>d</b> quartic
<b>ii.</b> The solution of the equation $x^2 - 1 = 0$ is _____.			
<b>a</b> $x = 1$	<b>b</b> $x = -1$	<b>c</b> $x = \pm 1$	<b>d</b> $x = \pm i$
<b>iii.</b> The solution of the inequality $3 < 1 - 2x \leq 7$ is _____.			
<b>a</b> $(-3, 1)$	<b>b</b> $(3, -1]$	<b>c</b> $[-3, -1)$	<b>d</b> $[-3, -1]$
<b>iv.</b> The $x$ - intercept of the equation $y = x + 6$ is _____.			
<b>a</b> no $x$ - intercept	<b>b</b> 6	<b>c</b> -6	<b>d</b> 0
<b>v.</b> The radius of the circle $x^2 + y^2 = 16$ is _____.			
<b>a</b> $(0, 0)$	<b>b</b> 4	<b>c</b> $\pm 4$	<b>d</b> 256
<b>vi.</b> The slope of the line passing through $A(-2, 7)$ and $B(1, -2)$ is _____.			
<b>a</b> 3	<b>b</b> -3	<b>c</b> 0	<b>d</b> -9
<b>vii.</b> Two lines are parallel to each other if and only if _____.			
<b>a</b> $m_1 < m_2$	<b>b</b> $m_1 = m_2$	<b>c</b> $m_1 m_2 = -1$	<b>d</b> $m_1 > m_2$
<b>viii.</b> $90^\circ =$ _____ radian			
<b>a</b> $\frac{\pi}{6}$	<b>b</b> $\frac{\pi}{3}$	<b>c</b> $\frac{\pi}{2}$	<b>d</b> $\frac{3\pi}{5}$
<b>ix.</b> $157.75^\circ =$ _____			
<b>a.</b> $157^\circ 3'$	<b>b.</b> $157^\circ 30'$	<b>c.</b> $157^\circ 33'$	<b>d.</b> $157^\circ 45'$
<b>x.</b> In a right triangle with $\theta$ as one of its acute angles, $\frac{\text{Adjacent}}{\text{hypotenuse}} =$ _____			
<b>a</b> $\sin \theta$	<b>b</b> $\cos \theta$	<b>c</b> $\tan \theta$	<b>d</b> $\sec \theta$

**Question 2**

**[4 Marks]**

Find two positive angles and two negative angles that are coterminal with the angle given below.

$65^\circ$

**Question 3**

**[5 Marks]**

If  $\cos \theta = \frac{4}{5}$ , then calculate the remaining trigonometric ratios.

**Question 4**

**[4 Marks]**

Two pairs of points are given below. Find whether the two lines determined by these points are parallel, perpendicular or neither.

$(-2, 4), (2, 10)$  and  $(1, 3), (4, 1)$

**Question 5**

**[4 Marks]**

Calculate the distance and the midpoint of the line segment that joins the pair of points given below.

$(-1, 1)$  ,  $(7, -5)$

**Question 6**

**[5 Marks]**

Solve the inequalities given below. Express the solution using interval notation and graph the solution set.

a.  $2(7x - 3) \leq 12x + 16$

**(2.5 marks)**

b.  $-2 < 8 - 2x \leq -1$

**(2.5 marks)**

**Question 7**

**[5 Marks]**

Find all real solutions of the equation given below by using the quadratic formula.

$$3x^2 - 8x + 4 = 0$$

**Question 8**

**[3 Marks]**

A 6 m ladder leans against a building so that the angle between the ground and the ladder is  $60^\circ$ . How high does the ladder reach on the building?

### Formula Sheet

**Quadratic formula:**  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

**Distance formulas:**  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

### Algebraic Formulas

$(A + B)(A - B) = A^2 - B^2$	$(A + B)^2 = A^2 + 2AB + B^2$
$(A - B)^2 = A^2 - 2AB + B^2$	$(A + B)^3 = A^3 + 3A^2B + 3AB^2 + B^3$
$(A - B)^3 = A^3 - 3A^2B + 3AB^2 - B^3$	$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$
$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$	

### Trigonometric Table

$\theta^\circ$	$\sin \theta$	$\cos \theta$	$\tan \theta$
0	0	1	0
30°	$\frac{1}{2}$	0.87	0.58
45°	0.71	0.71	1
60°	0.87	$\frac{1}{2}$	1.73
90°	1	0	<i>undefined</i>